

LOUISIANA'S FOURTH FOREST:

An Update



1996

This report updates the “Louisiana’s Fourth Forest” published in 1990. The purpose of this report is to provide an in-depth coverage of the many complex issues confronting the concerned public, industrial forest managers, public policy-makers and others within Louisiana’s forestry community.

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Executive Summary

The volume and values of timber products produced in Louisiana are significant. In 1995, sawtimber volume was 1.5 billion board feet, up from 1.4 billion board feet harvested in 1986. During the same period cordwood production increased from 4.8 million cords to 6.0 million cords.

In 1995, timber was Louisiana's largest agriculture crop. Forestry accounted for 27 percent of farm income in 1995, an increase from 18 percent in 1986.

The forest product industry was the second most important manufacturing industry in the State in 1995 measured by the number of jobs and payroll provided.

The pine resource in Louisiana grew consistently between 1954 and 1984. A 10.7 percent decline in the pine volume occurred between 1984 and 1991. If projections are accurate, much of the pine inventory build-up that occurred may be lost in the next 20 years.

In order to maintain adequate sources of wood for Louisiana's timber industry, forest land must be regenerated in a timely manner and at adequate stocking levels. The nonindustrial, private forest landowner regeneration needs are particularly acute.

The hardwood inventory declined substantially between 1935 and 1964, but has been building up slowly since 1964. Hardwood inventories are now slightly higher than pine and are projected to remain fairly stable over the next 20 years.

Cypress is still a relatively small portion of the total timber inventory, but has shown a slow, steady increase which is not likely to be reversed in the near future.

The rewards of private forestland ownership and the practice of private forestry are being increasingly shaped by public laws, regulations, and court decisions. Federal, state and local laws pertaining to land use and environmental protection are redefining forest management and timber harvesting options and influencing the cost and return from forestry investments.

Timber severance tax receipts generated \$15.5 million in 1995, an increase of 101 percent from the \$7.7 million collected in 1986. Seventy-five percent of the severance tax revenue is returned to the parishes in which the timber was severed, and the remainder goes into the State's general fund.

Louisiana law states that the owner of the timber at time of severance is responsible to pay severance taxes. Timber severance taxes have risen an average of 11 percent per year since 1988.

Timber severance tax or harvest tax varies by states. Louisiana timber owners pay the highest severance taxes in the South. The following is the amount of severance tax paid per unit of wood for the Mid-South States in 1996:

<u>State</u>	<u>Pine Sawtimber (\$/MBF)</u>	<u>Pine Pulpwood (\$/CD)</u>
Louisiana	\$8.13	\$1.19
Arkansas	1.42	0.45
Mississippi	1.00	0.31
Alabama	0.75	0.25
Texas	0.00	0.00

Severance taxes have an impact on the amount the timber owner receives for his or her timber when cut and sold, and when combined with income taxes (federal and state) and property taxes can represent a disincentive to invest in reforestation and management.

Fourteen states have cost-share programs funded by public or private sources to encourage forest management. Seven southern states have established cost-share programs for reforestation purposes, five of which are financed with state timber tax receipts. Louisiana does not have a state-funded cost-share program. Neighboring Mississippi has \$1.8 million available annually for reforestation practices which is collected from timber harvest tax. Annually, this amounts to reforestation of approximately 40,000 acres.

Four federal cost-share programs have traditionally provided financial assistance to Louisiana private forest landowners to reimburse them up to 50 percent of the cost of reforestation (site preparation and tree planting). Requests for cost-share payment for these programs far exceeded funds available.

In 1987, the Strategic Economic Conference for Forestry in Louisiana's Future formed a task force committee to identify issues and action plans under each issue. Since that time, two-thirds of the action items have been accomplished; however, there still remains much to be done if the imminent problem with Louisiana's pine resource is to be forestalled

Introduction

Timber production generates four to five billion dollars annually into Louisiana's economy. The direct economic impact includes the value of products manufactured by the State's sawmills, pulp, paper, chips, veneer, chipboard and other primary manufacturing plants. This figure does not include additional economic activity generated by secondary manufacturing, retail trade and spin-off industries and services, nor timber severance tax receipts.

Timber is Louisiana's largest agricultural crop. Measured by the number of jobs and payroll provided, the forest products industry is the second most important manufacturing industry in the State.

Since 1984, there has been a notable increase in the softwood harvest levels in the State. Louisiana has the highest ratio of softwood removals-to-growth, 1.22 to 1, of the Midsouth States, which average 1.09 to 1. In order to maintain adequate sources of wood to support a timber industry, Louisiana's harvested timberlands must be regenerated in a timely manner and at adequate stocking levels. The nonindustrial private forestland owner regeneration needs are particularly acute.

This report updates the report on "Louisiana's Fourth Forest" published in 1990. This report provides an in-depth coverage of the many complex issues confronting the concerned public, industrial forest managers, public policy-makers and others within Louisiana's forestry community.

The report is organized into four chapters. The first chapter describes the economic impact of Louisiana's forests. The next chapter summarizes and reviews the current resource conditions and future projection. The third chapter examines government policies that influence Louisiana's timber resource. The last chapter describes action taken to improve the future of Louisiana's forest resource since the 1990 report and recommendations for future actions.

VOLUME AND VALUE OF ROUNDWOOD TIMBER PRODUCTS

The volume and value of roundwood timber products produced in Louisiana are significant. In 1995, sawtimber volume harvested was 1.5 billion board feet, up from 1.4 billion board feet harvested in 1986. During the same period, chip-n-saw and pulpwood production increased from 4.8 million cords to 6.0 million cords. Pine dominates total harvests in Louisiana, more than 86 percent of total sawtimber production and 69 percent of total chip-n-saw and pulpwood production were pine in 1995.

The estimated value of landowner income derived from the sale of timber increased by 179 percent between 1986 and 1995. Landowner income was \$227.8 million in 1986 and \$635.3 million in 1995. Pine sawtimber was the chief product sold by landowners with 72 percent of the total harvest value (Figure 1.1). Pine chip-n-saw and pine pulpwood contributed an additional 5 and 14 percent of total harvest value. Hardwood sawtimber and hardwood pulpwood contributed the remaining harvest values.

Severance tax receipts generated \$15.5 million in 1995, an increase of 101 percent from the 7.7 million collected in 1986.

**VALUE OF TIMBER PRODUCTS COMPARED
WITH VALUE OF AGRICULTURAL COMMODITIES**

Timber was Louisiana's largest agricultural crop in 1995. Forestry sales, valued at the mill, were approximately \$1.1 billion. In contrast, cotton sales were \$540.1 million, poultry sales were \$324.2 million, cattle sales were \$236.5 million, marine fish sales were \$276.3 million, and sugarcane sales were \$274.3 million. Forestry accounted for 27 percent of farm income (Figure 1.2). This represents an increase of 18 percent since 1986.

**CONTRIBUTION OF FOREST INDUSTRIES
(TIMBER-BASED MANUFACTURING) TO THE STATE'S ECONOMY**

Forestry is a leading industry in Louisiana. In 1995, the industry provided 26,200 manufacturing jobs and had an annual payroll of \$825.3 million. About 13,600 workers earning \$320.3 million work in the lumber and wood products sector and 11,800 workers earning \$488.8 million work in the paper and related products sector. In addition the furniture and fixtures sector employs 800 workers and pays \$16.2 million in wages.

The forest products industry was the second most important manufacturing industry in the State in 1995. This was measured by the number of jobs and payroll provided. Timber-based manufacturing trailed only the chemical and allied products sector in economic importance for these two key indicators (Figures 1.3 and 1. 4).

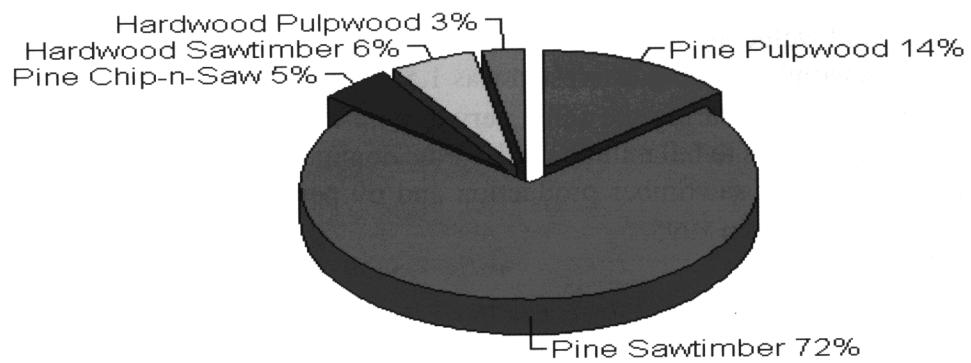


Figure 1.1 Landowner Income from Timber Sales, 1995

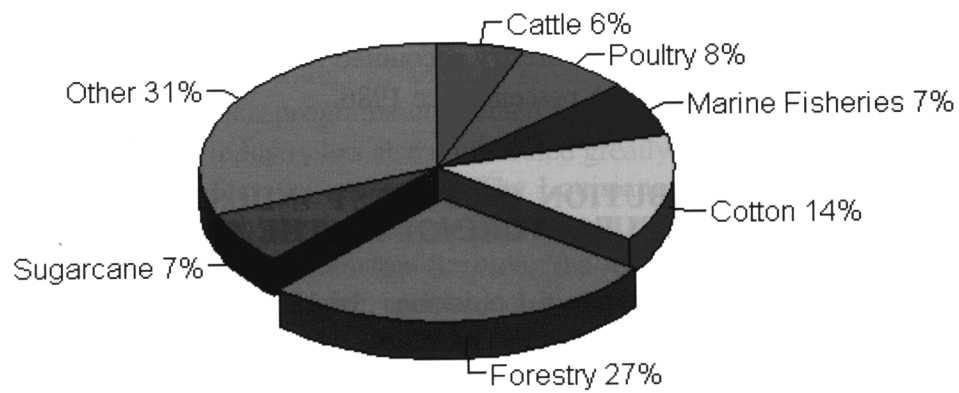


Figure 1.2 Gross Farm Income, 1995

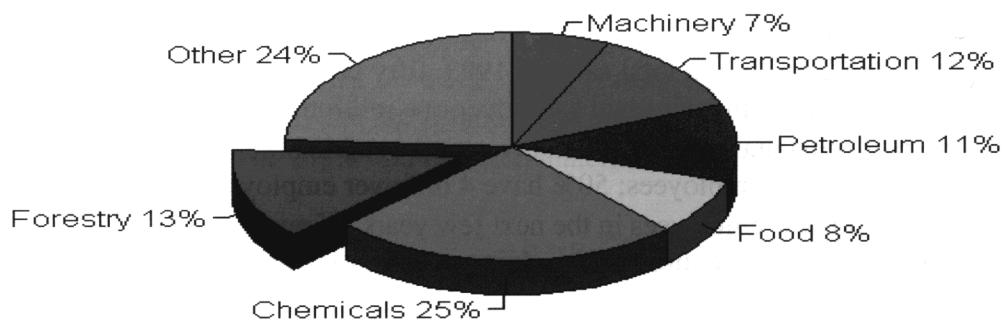


Figure 1.3 Manufacturing Payroll, 1995

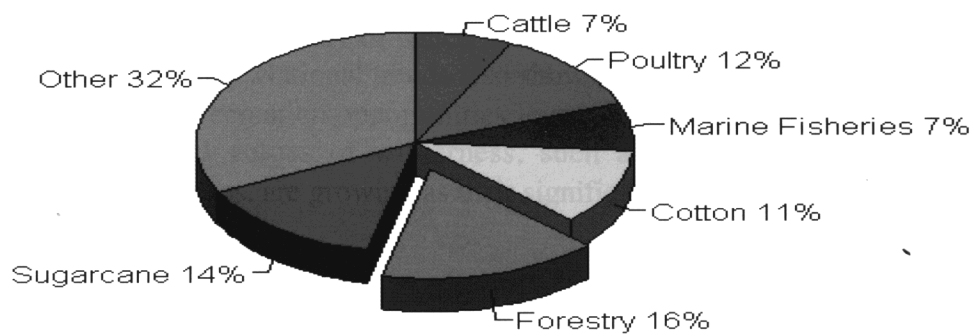


Figure 1.4 Manufacturing Employment, 1995

SECONDARY WOOD PRODUCTS INDUSTRY

There are 750 secondary wood-using companies in the State. They include furniture manufactures, cabinet makers, millwork plants and others that use products produced by primary wood-using industries. Most companies rely on word-of-mouth to promote products directly to consumers. Of the \$485.2 million in total sales in 1993, fifty percent of the companies had sales of \$150,000 or less. Only 18 companies had sales over one million dollars. The secondary wood products industry in Louisiana consists of many small establishments. More than 75% of companies have fewer than 10 employees; 50% have 4 or fewer employees. Fifty-five percent of the companies plan to add new employees in the next few years. If numbers are extrapolated to the entire Louisiana secondary wood products industry, 415 companies would add 1,941 new employees by 1999.

Louisiana secondary wood products manufacturers use a wide variety of species from many states and countries. Red oak is the predominant hardwood species followed by cypress, white oak and poplar. Of the 26.2 million board feet of softwoods used in 1993, over 90 percent was southern pine. Species used were supplied by out-of-state vendors 21.3 percent of the time. However, 78.7 percent of supply came from within Louisiana, but it was not possible to identify the source.

There is a wide array of secondary wood products industry needs. The top three categories are financial, marketing and production orientation, respectively.

INTRODUCTION

Louisiana's forest products industry depends on the forest resource base of the state for its existence. As the title, *Louisiana's Fourth Forest*, suggests, this resource base has been through several cycles of harvest and regeneration since the original native forests were first cut over in the early part of this century. Recently, the state's forest inventories reached a peak and pine inventories now appear to be declining. Hardwood inventories were still increasing at the time of the last state inventory, but hardwood removals also appear to be catching up with growth. The purpose of this section is to review the current status of the forest resource base and present some projections of what may happen to the state's timber inventories in the next decade and a half.

The primary source for information on state inventories is the USDA Forest Service, Forest Inventory and Analysis (FIA) research unit. The FIA has conducted six inventories of Louisiana's forest resources. The first was made in 1935 (Winters et. al. 1943). Nearly 20 years went by before the next survey was made in 1954 (USDA Forest Service 1955). This was followed by three more inventories at ten-year intervals in 1964, 1974, and 1984 (Sternitzke 1965, Murphy 1975, Rosson et. al. 1988). The most recent survey was completed in 1991, seven years after the 1984 survey (Vissage et. al. 1992). We are already over half-way to the next scheduled survey.

The 1990 report, *Louisiana's Fourth Forest* (Louisiana Department of Agriculture and Forestry 1990), presented historical information from 1952 to 1984—the most recent forest survey for Louisiana available at the time. Projections to the year 2030 were also included in the *Fourth Forest* report. Those projections were drawn from a major South-wide analysis (USDA Forest Service 1988). Since the publication of that report, the 1991 Forest Survey for Louisiana has been released, providing a 7-year period of documented change since 1984 (Vissage et. al. 1992). In addition, we have information about timber removals between 1991 and 1995 (Louisiana Department of Agriculture and Forestry, various years). Thus, it is possible to project with reasonable accuracy the status of Louisiana's timber inventory from the last inventory in 1991 up to 1995. Finally, on a more conditional basis, new projections have been made up to the year 2010 to identify potential problems and to aid in determining what can or should be done to bring about the most desirable forest situation possible for Louisiana in the future.

HISTORICAL TRENDS IN FOREST AREA AND TIMBER VOLUME

Area by Forest Type. Table 2.1 shows the area of timberland in Louisiana by forest type for 1974, 1984, and 1991—the years of the last three FIA surveys. The state's timberland acreage declined by 645,000 acres (4.4%) between 1974 and 1984, but declined by only 90,000 acres (0.6%) between 1984 and 1991. There were several significant changes between 1974 and 1984: the areas in natural loblolly/shortleaf, oak-pine, and oak-gum-cypress declined by more than

10%, while the areas in planted loblolly/shortleaf and oak-hickory increased by 10% and 25%, respectively. The most significant changes between 1984 and 1991 were the increase in the area in the planted loblolly/shortleaf pine type and the decreases in the area of both natural longleaf/slash pine and natural loblolly/shortleaf pine.

Table 2.1. Timberland area in Louisiana by forest type, 1974, 1984, and 1991 USDA. Forest Service FIA Surveys.

Forest Type	1974 (acres)	1984 (acres)	Percent Change '74 to '84	1991 (acres)	Percent Change '84 to '91	Percent Change '74 to '91
Planted Longleaf	575,735	544,001	-5.5	582,383	7.1	1.2
Planted Loblolly	837,337	926,794	10.7	1,592,632	71.8	90.2
Natural Longleaf	435,067	389,173	-10.5	287,279	-26.2	-34.0
Natural Loblolly	3,273,667	3,135,576	-4.2	2,560,932	-18.3	-21.8
Oak-Pine	2,174,765	1,896,541	-12.8	1,886,591	-0.5	-13.3
Oak-Hickory	1,736,853	2,170,437	25.0	2,107,155	-2.9	21.3
Oak-Gum-Cypress	5,047,283	4,360,567	-13.6	4,349,864	-0.2	-13.8
Elm-Ash-Cottonwood	407,136	417,182	2.5	401,311	-3.8	-1.4
Non-Stocked	29,816	32,329	8.4	14,873	-54.0	-50.1
Total	14,517,659	13,872,600	-4.4	13,783,020	-0.6	-5.1

Over the 17 years between 1974 and 1991, the timberland base declined by 735,000 acres, or 5.1%. The area of planted loblolly/shortleaf pine nearly doubled, from 837,000 acres to 1,593,000 acres. However, during this period the area in the natural longleaf/slash pine forest type declined by 148,000 acres, or 34%, and the area of natural loblolly/shortleaf pine declined by 713,000 acres, or 22%. Overall, the area in pine types decreased by 99,000 acres between 1974 and 1991.

Volume by Major Species Group. Table 2.2 shows the volume of pine, cypress, and hardwood timber in Louisiana for 1974, 1984, and 1991. The total inventory in the state increased by 2.6 billion cubic feet, or 15.4%, between 1974 and 1984. It then declined by 0.41 billion cubic feet (-2.1%) between 1984 and 1991. Pine inventories, which had increased by almost 20 percent between 1974 and 1984, declined by 10.6 percent between 1984 and 1991. Hardwood and cypress inventories continued to build up between 1984 and 1991, but the increases in those species groups were not enough to offset the decline in the pine inventories. For all species groups, however, inventories were higher in 1991 than they were in 1974.

Table 2.2. Timber inventory in Louisiana by major species group, 1974, 1984, and 1991
USDA. Forest Service FIA Surveys.

Species Group	1974 (cubic feet)	1984 (cubic feet)	Percent Change '74 to '84	1991 (cubic feet)	Percent Change '84 to '91	Percent Change '74 to '91
Pine	7,875,397,000	9,421,767,000	19.6	8,426,020,000	-10.6	7.0
Cypress	1,154,161,000	1,419,714,000	23.0	1,502,061,000	5.8	30.1
Hardwood	7,644,471,000	8,407,827,000	15.4	8,916,349,000	6.0	16.6
Total	16,674,029,000	19,249,308,000	15.4	18,844,430,000	-2.1	13.0

THE PROJECTION MODEL

The projections reported in the next section were produced using the Southern Timber Resource Inventory Projection System (STRIPS). STRIPS is an applied state timber inventory projection model which does not require economic inputs such as supply, demand, or price data. This section provides a brief overview of the model. The details of the model are reported elsewhere (McDill et. al. 1996, Tucker and McDill 1996).

STRIPS projects the forest type and volume of four species groups — pine, cypress, soft hardwoods, and hard hardwoods — of individual FIA plots. STRIPS was developed to analyze different supply scenarios at the state level. The model begins with the existing volume of each species group for each plot in the FIA database and adds an estimate of annual growth for each of the four species groups. The growth estimate is based on average growth rates between the previous two FIA survey cycles for each species group on plots of the same forest type and volume class. After growth has been added to each plot for the current year of the projection, removals are simulated as either clearcuts or partial harvests. Historical removals rates for each forest type, volume class, and harvest type (clearcut or partial harvest) are determined from FIA data based on the level of removals between the previous two surveys. These harvest rates are adjusted during a projection in order to meet an exogenously determined harvest target for each year. After growth and removals have been modeled, the forest type is changed for some FIA plots to simulate shifts in the acreage of each forest type over the projection period.

Before a projection is run, the model is first calibrated by projecting the data from the previous survey to the date of the current survey. The projection results are then compared with the known state of the forest at the time of the current survey. For the projections discussed in this paper, the 1984 Louisiana survey was projected to 1991 and the projection results were compared with the survey results for 1991. Adjustment factors are estimated to eliminate any discrepancies between the projected and the known state of the forest. Once the model is calibrated, a projection is run starting from the most recent survey to predict the future condition of the forest.

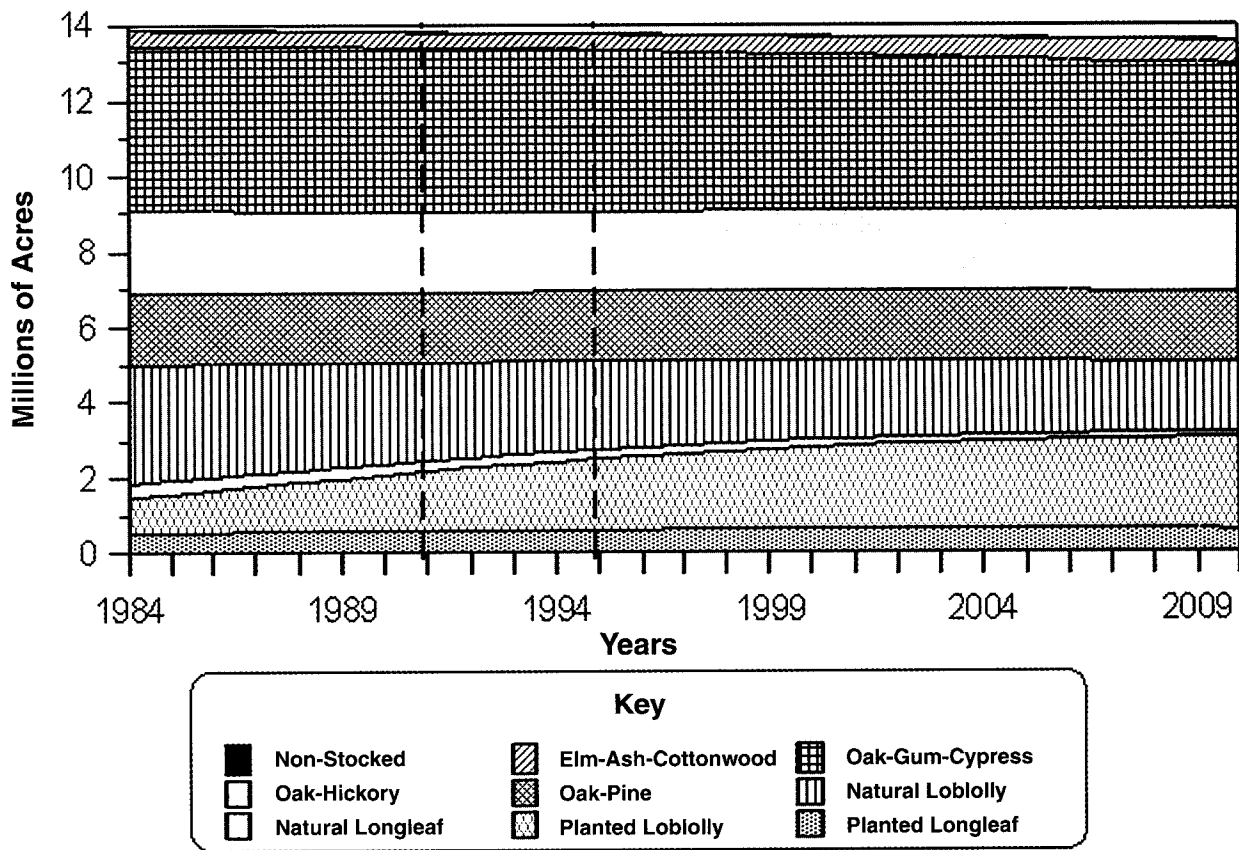


Figure 2.1 Historic and projected area of timberland in Louisiana by forest type — 1984 to 2010. (Areas in 1984 and 1991 are from FIA inventories; other areas are projections. Projections up to 1995 use historical removals data from severance taxes.)

Harvest targets for both calibration and projection runs were determined using a combination of severance tax data and FIA data. Severance tax data are needed because FIA data do not give annual removals estimates — only an average level between survey cycles. FIA removals are typically higher than average severance tax removals over the corresponding period. Severance tax data may underestimate timber removals due to harvested but unutilized timber and unreported harvests. FIA removals estimates are probably more accurate, but they may overestimate actual harvests. To correct for this discrepancy, annual severance tax removals were adjusted upward so that the average removal rate was closer to FIA removals.

The model assumes that management intensity and growth will remain the same during the projection period as during the historical period between the past two surveys (the calibration period). Removals are difficult to predict. To provide for a conservative estimate of removals over the projection period, removals targets were set at a level equal to the average of removals over the previous four years and held constant throughout the projection. This estimate is not a prediction of timber removals. Rather, this projected level of removals provides a reasonable starting point for discussions of the likely consequences of different harvest rates.

PROJECTION RESULTS

Forest Type Acreage. Figure 2.1 shows the area of timberland by forest type between 1984 and 1991 and projections through the year 2010. Trends from the calibration period (1984-1991) tend to continue into the projection. The area of planted loblolly/shortleaf pine is projected to continue to increase, while the areas in the natural loblolly/shortleaf pine and natural longleaf/slash pine forest types are projected to continue to decrease. The areas in the other forest types are projected to remain relatively stable.

Pine Inventory, Growth and Removals. Figure 2.2 shows projections of the pine inventory for 1984 to 2010. Note that growth and removals are plotted against the left axis of the figure, while the inventory is plotted against the right axis. The scale of the left axis (growth and removals) is one tenth of the scale on the right axis (inventory). Thus, where the removals line crosses the inventory line in the year 2010, annual pine removals are projected to equal one tenth of the total pine inventory. Similarly, growth rates, expressed as a percent of the inventory, are easy to identify. Pine growth rates are projected to increase from about 5.0% in 1984 to 8.3% in 1991. The two dashed lines in the figure separate periods of differing degrees of certainty regarding the projections. Between 1984 and 1991, the figure basically reports historical data based on FIA inventories. Between 1991 and 1995, removals rates, at least, are based on historical data. Beyond 1995, the projections are based on conservative estimates of removals based on average removals for 1992 through 1995.

The most striking trend in Figure 2.2 is, of course, the projected decline in the inventory of pine. The inventory is projected to decrease from 9.4 billion cubic feet in 1984 to 5.5 billion cubic feet in 2010—a decline of over 40 percent. This happens in spite of a projected decline in the pine removals rate, as the model shifts removals away from the increasingly scarce pine resource to the relatively more abundant hardwood resource. The decline in the pine inventory also occurs in spite of the increasing pine growth rates mentioned earlier. This increase in the pine growth rate is due to the increasing proportion of the pine area that is in planted types.

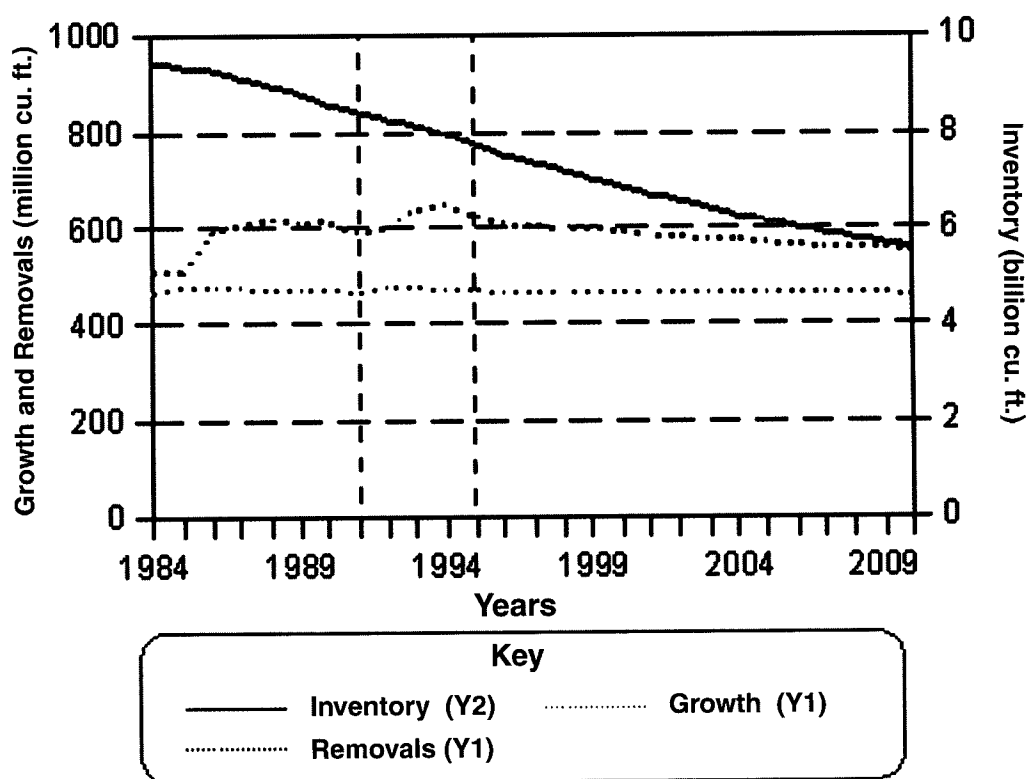


Figure 2.2 Historic and projected Louisiana pine inventory, growth and removals -- 1984 to 2010.

Hardwood Inventory, Growth and Removals. Figure 2.3 shows projections of the hardwood inventory for 1984 to 2010. As in Figure 2.2, growth and removals are plotted against the left axis of the figure, and inventory is plotted against the right axis. In spite of historical increases in the hardwood inventory volume, the hardwood inventory is projected to peak around 1995 at a level of about 9.02 billion cubic feet and then begin a gradual decline. By 2010, the hardwood inventory is projected to decline to 8.5 billion cubic feet—a decline of 5.7 percent from the projected peak in 1995. Unlike pine, the projected growth rate for hardwoods is fairly stable.

Cypress Inventory, Growth and Removals. Figure 2.4 shows projections of the cypress inventory for 1984 to 2010. Cypress inventories are projected to level off at a little over 1.5 billion cubic feet. Cypress removals are projected to increase gradually, while growth is projected to remain fairly stable.

SUMMARY

Figure 2.5 summarizes the history of the forest inventories of Louisiana from 1935 to the present and shows our projections of those inventories through 2010. Although procedures and standards have varied over this time, making computation of comparable statistics a bit difficult, it is interesting to observe the historical levels of timber inventories over this 56-year period, combined with our 19-year projections.

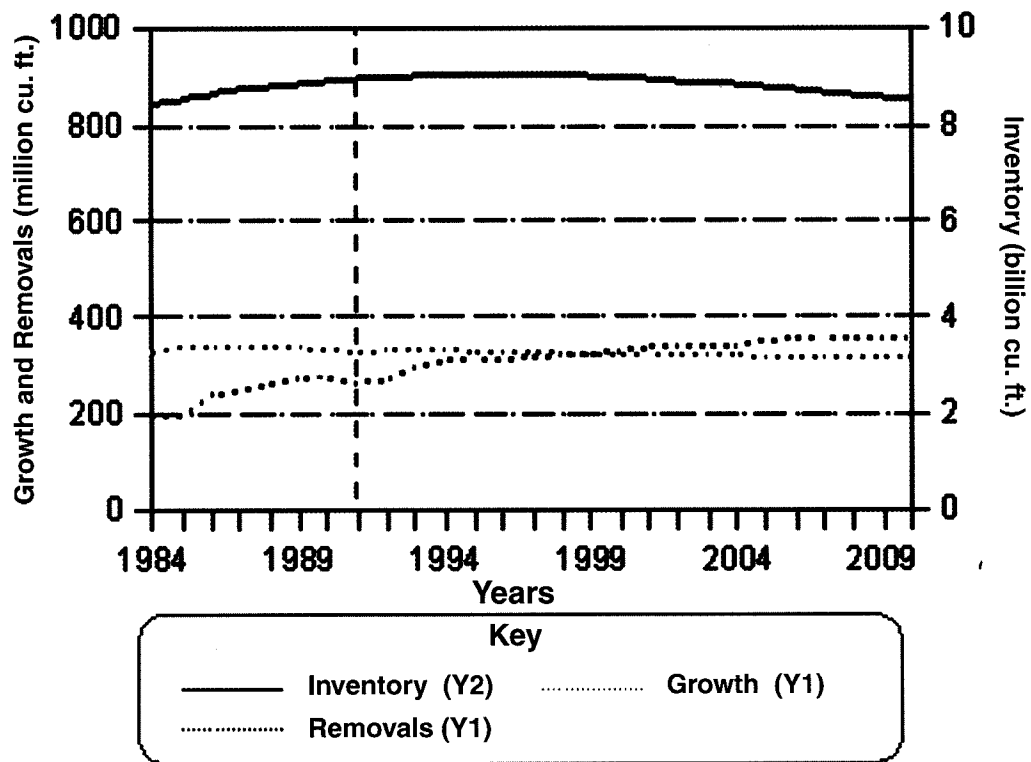


Figure 2.3 Historic and projected Louisiana hardwood inventory, growth and removals -- 1984 to 2010.

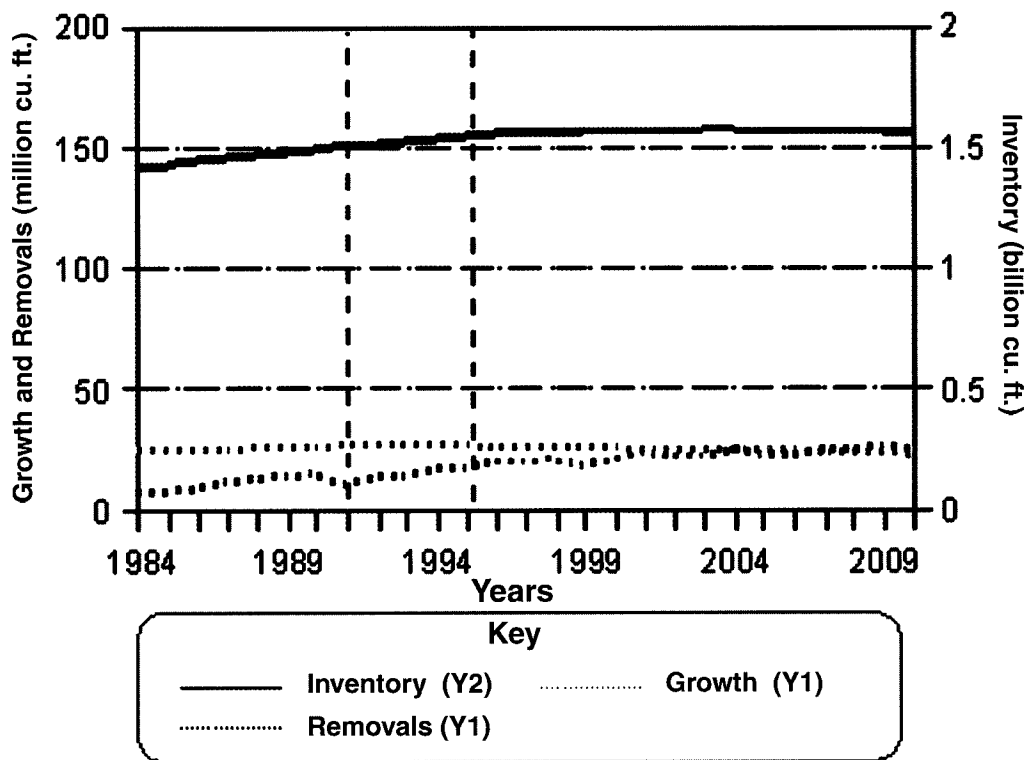


Figure 2.4 Historic and projected Louisiana cypress inventory, growth and removals -- 1984 to 2010.

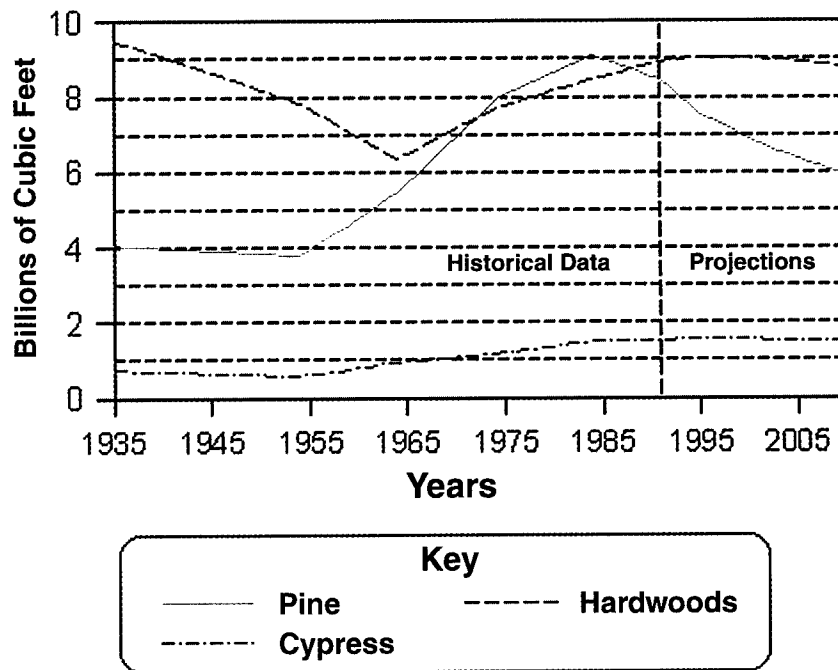


Figure 2.5 Louisiana Forest Survey inventories of growing stock by major species group -- 1935 to 2010.

Pine inventories went up consistently between the 1954 and the 1984 surveys. A modest decline showed up in the 1991 survey, but compared with historical pine inventories, the situation still did not look too bad. However, if our projections are accurate, much of the inventory build-up that has occurred with pine could be lost in the next 20 years. This is in spite of the modeled addition of over a million new acres of planted pine (in addition to the replacement of existing plantations when they are harvested), and, one might argue, fairly conservative removals estimates. These projections do little to dispel the concerns that already exist about the future of Louisiana's pine resource.

The hardwood inventory declined substantially between 1935 and 1964, but it has been building up slowly since 1964. Hardwood inventories are now slightly higher than pine inventories, and—in contrast to pine inventories—hardwood inventories are projected to remain fairly stable over the projection period. It is not likely that hardwood inventories in the state will again reach the level observed in 1935, however. In addition, a quality analysis would undoubtedly indicate that the more recent hardwood inventory is in smaller diameter classes and of poorer quality than in the earlier years. Cypress is still a relatively small proportion of total timber inventories, but has shown a slow, steady increase which is not likely to be reversed in the near future.

INTRODUCTION

This chapter examines some of the factors that can affect the State's future timber supply outlook. Factors that will be discussed include: legislative and tax policies, such as environmental laws and incentive programs; export and trade policies; technological changes; and recreational demands.

Louisiana forest landowners operate under a complex array of federal, state, and local government policies. While many of these policies apply to private enterprise in general, a number specifically affect forest land use.

The legal framework for forestry in Louisiana can be categorized into three types of laws with varying effects on forestry investments. The first type of laws are designed to prevent environmental degradation. If implemented using a command and control approach, such laws may act to limit forest management options and result in avoidance tactics on the part of forestland owners. The second type, management assistance programs such as cost-share programs, extension, and technical assistance, seek to remove financial or knowledge-related barriers to the use of sound reforestation, management, and harvesting practices. The third type, federal and state tax laws, are intended to improve the long-term financial viability of forestry investments. Due to the long time periods required to grow timber, taxation may be of greater importance to forest management decisions than to other business investment decisions.

ENVIRONMENTAL LAWS

The rewards of private forestland ownership and the practice of private forestry are increasingly shaped by public laws, regulations, and court decisions. Federal, state, and local laws pertaining to land use and environmental protection are redefining forest management and timber harvesting options and influencing costs and returns from forestry investments.

Concerns about decreasing biological diversity, protection for threatened and endangered species, water and air quality, and other environmental attributes are being played out in the reauthorization debates and administrative and judicial interpretations of the federal Endangered Species Act (ESA), the Clean Water Act (CWA), and the Coastal Zone Management Act (CZMA), and the Clean Air Act (CAA), as well as state and local statutes.

Among the most visible reactions to these laws from landowners has been the private property rights movement. Nearly all states have introduced legislation addressing private property rights, and at least 23 states have enacted laws. In 1995, the Louisiana legislature passed the Right to Farm and Practice Forestry law (Act 302). The Act requires state agencies to complete impact assessments of regulations on farm and forestland. It also gives landowners remedy to seek compensation for diminution of 20 percent or more of property value.

Various scenarios could occur as a result of changes in the regulatory environment for forestry. Possible negative effects include: (1) reduced long-term private timber supply due to accelerated harvest of financially premature stands and lower levels of investment in silvicultural treatments, and (2) increased costs for forest operations resulting from regulatory timber harvest, reforestation, or road construction requirements. Possible benefits include: (1) improved environmental conditions, and (2) increased harvest returns to some landowners due to timber price increases driven by the reduced supply.

The effect of state and local regulations on timber supply from private forestlands was the topic of a study by the Forest Law and Economics Research Unit of the USDA Forest Service, Southern Research Station. State and local regulations were estimated to reduce current harvests of softwood products from private forestlands by 3 to 4 percent, and current harvests of hardwood products by 2 percent.

Further, the study indicated that over the next ten years the laws and ordinances currently in place will have a much greater effect, reducing private harvests of both softwood and hardwood products in Louisiana and other South Central states by roughly 15 percent. The study forecasts additional regulations will be enacted in the areas of water quality, endangered species, and forest practices. As a result, real sawtimber stumpage prices are projected to increase some 25 percent by the year 2000, and to remain substantially higher than current prices over the next several decades.

The Endangered Species Act

Protecting wildlife and plant species in danger of extinction has been a part of federal environmental law for more than 20 years. In addition to the federal Endangered Species Act, Louisiana is one of 46 states that have enacted endangered species protection laws and programs of their own. Louisiana has six listed species that rely on forested habitat: (1) Louisiana black bear (nine parishes in the Tensas and Atchafalaya basins), (2) red-cockaded woodpecker (ten parishes), (3) gopher tortoise (Washington Parish), (4) bald eagle (21 parishes), (5) Louisiana pearlshell mussel (Rapides Parish), and (6) the Louisiana quillwort (a species of fern; Washington and St. Tammany Parishes).

The ESA provides strong authority to control private forest practices, either directly through prohibition of illegal takings, or indirectly through restrictions on federally funded or authorized activities. Under the ESA, actions by federal agencies or private projects that depend on federal licenses, contracts, cost-shares, leases, easements, rights-of-way, permits, and grants can be reviewed for their potential to adversely alter habitat for an endangered species. Section 9 forbids the "taking," i.e. killing or harm, of threatened or endangered fish or wildlife. A recent Supreme Court decision held that habitat modification is a form of take. Accordingly, activities such as harvesting, thinning, pruning, site preparation, and prescribed burning may be potentially harmful activities.

In a cooperative study by the Forest Law and Economics Research Unit and the Louisiana

Office of Forestry, the opportunity cost for protecting red-cockaded woodpecker (RCW) in Central Louisiana was found to range from \$143 to \$1,486 per acre. The per-acre cost was much greater for RCW clusters on small ownerships than on large ones. The USDA Forest Service plan for management of the red-cockaded woodpecker on the Kisatchie National Forest is to increase the number of active clusters from 340 clusters to 1,457. Landowners whose ownerships are intermingled with or border on National Forest lands are likely to encounter more RCWs in the future.

In the study of the effect of state and local regulation summarized above, endangered species regulation alone was estimated to reduce current harvests from private forestlands in South Central states by 1 to 2 percent. The effect was predicted to increase to 7 to 9 percent within ten years time.

Clean Water Act

The Clean Water Act addresses forest practices on two broad fronts -- Sections 208 and 319 concern the nonpoint source (NPS) pollution program, while Section 404 regulates dredge and fill operations in wetlands.

Nonpoint Source Pollution (Section 208) -- Silvicultural activities are a relatively minor cause of NPS pollution impacts to surface waters in Louisiana. The state utilizes a non-regulatory program for silvicultural NPS pollution control. However, under the State Water Control Law, the Louisiana Department of Environmental Quality has the authority to regulate and initiate enforcement actions for silvicultural NPS pollution on a complaint basis. The program is a cooperative endeavor by the Louisiana Office of Forestry, the Louisiana Forestry Association, and the Louisiana Department of Environmental Quality. The program promotes the use of Best Management Practices (BMPs) in reforestation, harvesting, road construction and other forest operations through educational programs and demonstration projects. In a study assessing the cost of implementing State BMPs on three physiographic regions in the South, expenses on coastal plain sites averaged \$7.10¹ per acre or 1.2 percent of gross harvest revenues. A more stringent set of standards, which could be required under future water quality protection guidelines, increased costs to \$17.50¹ per acre or 2.9 percent of gross harvest revenues. A 1994 survey placed the compliance rate for BMP use at over 80 percent, a substantial improvement over the 51 percent rate reported in 1991. The Louisiana Office of Forestry anticipates continued improvement in compliance in the future.

Wetlands (Section 404) -- Under Section 404 wetlands regulations, normal forestry activities such as harvesting, thinning, and timber stand improvements are exempt from permit requirements. Construction or maintenance of forest roads also are exempt if they are conducted in accordance with approved best management practices. The silvicultural exemption is important for forestry in avoiding reforestation delays or liabilities imposed by other environmental laws.

¹1987 costs are adjusted to 1995 dollars.

The 1990 Farm Bill authorized several programs to protect water quality and wetlands which promote forestry. The Wetlands Reserve Program is designed to purchase conservation easements from farmers to restore wetlands. As party to the easement, landowners are able to restore and enhance wetlands through afforestation and ongoing forest management. The Farm Bill also contains the so-called Swampbuster provisions which encourage farmers to retain forest cover by retracting subsidies for owners who convert wetlands to cropland.

Coastal Zone Act

In a recent revision to the Coastal Zone Act, the EPA has recommended specific management measures for forestry, including preharvest notification, road construction, streamside management, timber harvesting, site preparation, revegetation, and others. These measures are similar to BMPs but would be mandatory in the coastal zone. The Louisiana Coastal Zone Management plan has been reviewed by the DEQ and submitted to NOAA/EPA for approval. In the plan, due to the limited nature of forestry's contribution to water pollution, an exemption for forestry operations was requested and the coastal zone boundary remaining as in Section 361 of the current Act. Both of these requests were denied by NOAA/EPA.

In the study of the effect of regulation, the state water quality regulations described in these sections had little discernible effect on current private timber harvests, but are expected to reduce harvests by 3 to 5 percent within the next ten years.

Clean Air Act

The Clean Air Act established a national policy of protecting and enhancing air quality. The law authorized EPA to establish standards for various categories of pollutants, including total suspended particulates, a pollutant produced in wood combustion. States have drafted, and now enforce, state implementation plans (SIPs) to achieve and maintain the air quality standards. The states vary considerably in their approaches to implementing the Clean Air Act provisions. Most have developed notification requirements for prescribed burns, voluntary air quality standards, and restrictions on timing of burns.

Prescribed fire has long been regarded as an important management tool for improving forest productivity, as well as the enhancement of other forest resources. In Louisiana, nearly 500,000 acres are burned under controlled conditions annually. Louisiana has a detailed set of prescribed burning and smoke management guidelines. The state distributes this information to burners through training courses.

In the past five years, six southern states have enacted legislation to promote the use of prescribed burning of forestland by limiting landowners' liability for damages or injuries from fire or smoke, provided negligence is not proven. The Louisiana law, enacted in 1993, recognizes the importance of prescribed fire to economic and biological resources and states that the use of prescribed fire is a property right of landowners. For liability protection, the Act requires the presence of at least one State certified burner from the time of fire ignition until completion.

Certification requirements include experience in the ignition of prescribed fires and completion of a training workshop. It is anticipated that this law will provide a more favorable legal environment for forestry burning and promote increased use in the management of Louisiana's forests.

Local Regulations

Louisiana has a growing number of local (municipal and parish) ordinances that affect forestry practices. Local ordinances have proliferated as a result of the extension of urban values as urbanization has expanded into previously rural areas. Twenty-six individual parishes have ordinances that affect forest management or harvesting. More than half of the parish ordinances were passed prior to 1990 to protect public rights-of-way and drainage systems from debris or damage from logging trucks.

Additionally, two parishes on the fringes of urban growth areas -- St. Tammany near New Orleans and West Feliciana near Baton Rouge -- have enacted ordinances that regulate forest practices. Since 1985, St. Tammany has implemented harvesting ordinances under its land-clearing permit system. Permits are required for land-clearing which include development clearing, clearcut and selective timber harvesting. For clearing operations, a \$10,000 performance bond is required. Replanting within 6 months of harvest is mandatory; however, landowners with written management plans and certified tree farmers may be exempted from specific reforestation requirements.

St. Tammany Parish rules also require permits from the Parish Department of Development for the removal or damage of live oak or cypress trees 6 inches DBH or larger, the retention of 25-foot buffers along improved roads, and 100-foot buffers along the parish's system of planned corridors (trails, scenic roadways and waterways). State scenic river protection rules require a 100-foot buffer along scenic rivers, as well.

Additional harvesting rules apply in the parish's southern growth management area: the retention of 25-foot uncut buffers along waterways and 50-foot uncut buffers adjacent to residences. Since records began in 1990, about 400 harvests have been conducted under the system.

The number of parish ordinances in Louisiana is unusually high for a south central state which represents three-fourths of all local regulations in the region. Local regulation concerns forest landowners and policy-makers because they apply to relatively small areas which cumulatively can create a mosaic of differing regulatory requirements across a state.

Local regulation is estimated to reduce current private timber harvest by 1 to 2 percent; the effect is expected to double, to 2 to 4 percent within ten years.

FOREST MANAGEMENT INCENTIVES

Cost-share Programs

Four federal cost-share programs have traditionally provided financial assistance to Louisiana private landowners: The Agriculture Conservation Program (ACP, 1936), the Forestry Incentives Program (FIP, 1974), the Conservation Reserve Program (CRP, 1985), and the Stewardship Incentives Program (SIP, 1990). Each of these programs reimbursed landowners for 50 percent of the cost of approved practices, such as reforestation, timber stand improvement, or other investments in forest productivity and stewardship.

Provisions of the 1996 Farm Bill establish a number of changes in forestry and conservation cost-share programs. The CRP and the FIP, which were scheduled to terminate in 1995 under the 1990 Farm Bill, were reauthorized through the year 2002. The CRP enrollment was capped at a maximum of 36.4 million acres, a decrease from 38 million acres in recent years. The ACP was combined with several other conservation programs into a single, newly-created program, the Environmental Quality Incentives Program (EQIP). Funding for CRP, FIP, EQIP and SIP is established in Congressional appropriations and it is anticipated that funding will be significantly less than historic levels in 1996.

Louisiana does not have a state-funded cost-share program. Fourteen other states have such programs funded by public or private sources. Seven southern states have established cost-share programs, five of which are financed with timber harvest tax receipts.

Technical Assistance

Professional assistance in management planning and stand regeneration is available from the Louisiana Office of Forestry, USDA Natural Resources Conservation Service, and the LSU Cooperative Extension Service. Private consultants and industry landowner assistance foresters also provide these services plus timber marketing services. Research has shown that technical assistance increases the likelihood of reforestation, returns higher timber values to the landowner, leaves residual stands in better condition, and increases the likelihood of operators incorporating BMPs in harvesting operations.

TAX POLICIES

Taxes affect the financial viability of forest management decisions and are an important factor in determining the level of stewardship forest owners practice, as well as the types of forest outputs they produce. Income, property, and estate taxes are the primary types of taxes that affect private forest ownerships.

Federal Taxes

Taxes can be a significant part of the cost of holding land and growing trees, and can deter reforestation investments. From the time it went into effect in 1944 until it was eliminated under the 1986 Tax Reform Act, the ability to exclude a part of long-term timber capital gains from taxable income was hailed by many as the primary impetus to reforesting cut-over land and adopting timber management practices. The excludable portion varied over the period, but stood at 60 percent at the time the 1986 Act passed.

Harvest timing decisions can be influenced by tax policy. For example, the elimination of preferential treatment for long-term capital gains in 1986 created a flurry of harvests in 1987, as forestland owners took advantage of the last year this incentive was available. Some landowners have held their timber off the market ever since, in anticipation that a capital gains exclusion will be reinstated.

Capital gains treatment still provides forestland owners one important benefit: the 28 percent tax rate on net long-term capital gains is substantially lower than the 36 percent or higher rate most owners would pay if their timber receipts were taxed as ordinary income. The purpose of this differential was to make forest management and other long-term investments competitive with shorter-term ventures. Forest industry and owners of large nonindustrial tracts have reacted to the incentive with increased reforestation, but the response from owners of smaller woodlands has not been significant.

For tax purposes, reforestation costs are classified as a capital expenditure and must be held in a capital account until the timber is harvested. Having to postpone recovery of these initial investment costs for the entire rotation exacerbates the capital availability problem faced by many landowners and discourages investment in reforestation and management. In contrast, annual management expenses, property taxes, and the cost of silvicultural treatments are considered operating costs and can be expensed in the year they occur. These costs are investments in marginal production and could be viewed as receiving preferential tax treatment under these rules.

Relief from capitalizing reforestation costs was created with passage of the Federal Economic Recovery Act of 1981. The Act established an investment tax credit of 10 percent of the first \$10,000 of qualifying reforestation expenses. It also allows amortization of 95 percent of the reforestation expenses (100 percent if no tax credit is taken) over the first 8 years of the rotation. These reforestation tax incentives were retained in the 1986 Tax Reform Act; they have had a very positive impact on rates of return from forest investments.

In addition to income tax, forest properties are subject to federal and state death taxes. Landowners' heirs and estates do not pay capital gains on timber until it is cut. The basis value for inherited forests is the fair market value at the time of the decedent's death. This stepped-up basis can substantially lower the taxable gain from the sale of timber or timberland.

State Taxes

Louisiana forest landowners pay an annual property tax, income tax on net harvest returns, and severance tax on the volume of timber removed in a harvest. Each of these taxes may reduce returns to the forest landowner by 5 to 6 percent, for a total tax burden of 15 to 18 percent. The tax burden in other southern states ranges from 11 to 23 percent, with Louisiana representing the median rate.

Property tax has a greater potential impact on forest returns than the other taxes. Forest property in Louisiana is assessed on its current use. Property tax rates vary among the parishes, but a study conducted by the Forest Resource Law and Economics Research Unit of the USDA Forest Service found that, on average, they are lower than those in other southern states and on a par with those in western states.

The state income tax, with a top bracket of 6 percent of adjusted gross income, also is lower than in many states.

Louisiana severance tax is among the highest in the nation, but its effective rate is lower than the yield taxes common in western states.

Timber severance tax receipts generated \$15.5 million in 1995, an increase of 101 percent from the \$7.7 million collected in 1986. Seventy-five percent of the severance tax revenue is returned to the parishes in which the timber was severed, and the remainder goes into the State's general fund.

Louisiana law states that the owner of the timber at time of severance is responsible to pay severance taxes. Timber severance taxes have risen an average of eleven percent per year since 1988.

Timber severance taxes vary by states across the South. Louisiana timber owners pay the highest severance taxes in the South. The following is the amount of severance tax paid per unit for the Mid-South States in 1996:

<u>State</u>	<u>Pine Sawtimber (\$/MBF)</u>	<u>Pine Pulpwood (\$/CD)</u>
Louisiana	\$8.13	\$1.19
Arkansas	1.42	0.45
Mississippi	1.00	0.31
Alabama	0.75	0.25
Texas	0.00	0.00

Severance taxes have an impact on the amount the timber owner receives for his or her timber when cut and sold, and when combined with income taxes (federal and state) and property taxes, can represent a disincentive to invest in reforestation and management.

Fourteen states have cost-share programs funded by public or private sources to encourage forest management. Seven southern states have established cost-share programs for reforestation purposes, five of which are financed with state timber tax receipts (severance tax). Louisiana does not have a state-funded cost-share program. Neighboring Mississippi has \$1.8 million available annually for reforestation practices which is collected from timber harvest tax. Annually, this amounts to reforestation of approximately 40,000 acres.

EXPORTS AND TRADE POLICY

Exports

Export demands for Louisiana forest products have changed substantially since the mid 1980s. Overall, both wood and paper product exports surged in the late 1980s, as a weak dollar made U. S. products cheaper and more competitive in foreign markets (Table 3.1). Since 1990, however, Louisiana forest product exports have leveled off, largely due to recessions in major overseas markets.

Table 3.1. Louisiana Forest Product Exports

<u>Year</u>	<u>Lumber and Wood Products</u>	<u>Paper and Allied Products</u>
(Million Dollars)		
1987	\$55	\$225
1990	97	274
1991	79	354
1992	99	346
1993	101	295
1994	93	331

Of more interest than the trends in total shipments have been changes in exports of individual products, particularly on the wood products side. Although hardwood and softwood lumber are the largest product exports, hardwood wood chips and southern pine logs have been responsible for most of the recent growth in wood product exports. In the late 1980s, new markets emerged for hardwood chips in the Far East and for softwood logs in Turkey. The chip market has grown the most, reaching a total of 470,000 green tons shipped from Louisiana ports in 1994. Japan and South Korea have been the primary buyers, although Taiwan also has purchased chips in some years.

Future exports of forest products from Louisiana will be influenced by many factors. Exchange rates, or the value of the dollar against foreign currencies, appear to be a dominant factor affecting the aggregate level of shipments and our overall competitiveness in foreign markets. But other factors may have more influence on the demand for individual products. Exports of softwood lumber will be affected by increased domestic demand, due to reduced harvests on federal lands in the Pacific Northwest, but softwood lumber imports from Canada may moderate potential domestic market increases. An emphasis on value-added manufacturing by the forest products industry also will affect exports, to the extent that high quality clear material is used for secondary wood products manufacturing in the state. However, future growth in both wood and paper exports from Louisiana is expected, in part because of the opening of the market in Mexico that will occur in coming years as a result of the North American Free Trade Agreement (NAFTA).

Trade Legislation

Trade agreements and their impacts on international trade can vary greatly. Two important regional trade agreements have been negotiated in recent years, with Canada and Mexico, and discussions are underway for expanding the agreements to other Latin American countries. Both of these agreements and other recent trade negotiations have focused on tariff reductions, with generally little attention paid to non-tariff barriers.

Of most interest for Louisiana is NAFTA, which took effect January 1, 1994. For most Mexico-United States and Canada-Mexico trade, NAFTA will either eliminate existing customs duties immediately or phase them out in five to ten years. Because of the high tariffs that existed in Mexico, it is generally felt that the U. S. Forest products industry--particularly in the Southeast and Southwest--will benefit from NAFTA.

For the most part, trade legislation and policy is the province of the federal government. This has been illustrated by controversy over log export restrictions in the Pacific Northwest. Under pressure from sawmills dependent on federal timber, Congress has restricted the export of unprocessed timber from federal lands in the West since 1968. Subsequently, four western states also enacted bans limiting log exports from lands managed by the respective states; however, these were overturned by court decisions which found such bans to be a violation of the commerce clause of the U. S. Constitution.

One area which states have been chartering a more active role in trade-related activities is in export financing and promotion. Louisiana was one of the first states to initiate efforts to become involved in export finance. In 1976, Title 9 of the Louisiana Revised Statutes was amended to permit the Governor to establish a trust fund which could be used to facilitate the financing of exporters; however, this authority was never utilized. In the early 1980s, other states began exploring involvement with export financing, and by the early 1990s, more than 30 states had authorized programs ranging from counseling to loan guarantees that related to export financing. Despite its early lead, however, there was little activity in Louisiana until 1994, when the state joined the City/State program of the Export-Import Bank of the United States. This program is a

partnership between the Ex-Im Bank and state and local finance and economic development agencies which provide the Bank's services to exporters in their area.

Louisiana has been more active in the trade promotion arena. The department of Economic Development has conducted numerous trade missions to foreign markets, and has several trade offices overseas. Recently, the Louisiana Department of Agriculture and Forestry has opened a trade office in Mexico to promote export opportunities for southern pine products and consumer foods.

TECHNICAL PROGRESS AND RECYCLING

Technical progress and recycling represent the two areas that promise to have significant and immediate impact on the timber supply situation. In the sections below the effect of these two developments on the pulp and paper industry as well as the lumber industry will be discussed.

The Pulp and Paper Industry

As shown in Table 3.2, the pulpwood required per ton of pulp produced has been fairly steady over the last forty-two years. For example, the pulpwood consumption per ton of pulp produced stood at 1.59 cords in 1950. By 1992, the figure was 1.62 cords per ton of pulp produced. Although the figure varied over the years, pulpwood requirement per ton of pulp produced would be somewhere between 1.55 to 1.60 cords per ton of pulp produced. While much technical progress was made during the last 42 years, the cumulative effect of this technical progress on the pulpwood requirement per ton of woodpulp produced is apparently quite insignificant.

Table 3.2. U.S. Pulpwood Consumption, Woodpulp Production, and Pulpwood Requirement per Ton of Woodpulp Produced

Year	Pulpwood Consumption	Woodpulp Production	Pulpwood Required per Ton of Pulp Produced
1950	23,627	14,849	1.59
1970	67,562	43,546	1.55
1990	99,109	63,050	1.57
1992	105,275	64,907	1.62

Source: Ulrich, 1987
 Ulrich, 1990
 USDA Agricultural Statistics, various.

In terms of recycling, wastepaper is accounting for an increasing share of the fiber consumed in paper and paperboard production. As shown in Table 3.3 between 1970 and 1993 the amount of wastepaper consumed by the paper and paperboard industry increased almost 2.5

fold from 12,021 to 29,169 tons. More importantly, the utilization rate has increased over 10 percentage points. This increase in waste paper utilization rate has helped the paper and paperboard industry expand its production over the years without causing a proportional increase in the wastepaper utilization on the virgin fiber supply. For every 1% increase in wastepaper utilization in cords of pulpwood per ton of woodpulp produced, the extra amount of wastepaper consumed is equivalent to 1.4 million cords of pulpwood, which is about 25% of the pulpwood produced in Louisiana in 1995. In order to further extend the virgin fiber supply, the paper and paperboard industry spent approximately \$7.5 billion between 1988 and 1995 (1995 North American Pulp and Paper Factbook) and intends to spend another \$10 billion for the balance of this decade to convert a considerable portion of its capacity to incorporate some recycled fiber.

Table 3.3. Utilization of Wastepaper by US Paper and Paperboard Mills

Year	Wastepaper Used	Paper/Paperboard Produced	Utilization Rate (%)
	Thousand Tons	Thousand Tons	
1970	12,021	51,671	23.26
1980	15,094	63,600	23.73
1990	22,007	80,344	27.39
1993	29,169	84,957	34.33

In order to meet the demand for wastepaper and address the growing concern about the environment and waste disposal, the American Forest and Paper Association set a goal in 1990 of recovering, by 1995, 40% of the paper and paperboard consumed in this country. After reaching that goal in 1993 the Association announced a still more ambitious goal of recovering 50% of the paper and paperboard consumed in the country by year 2000 (1995 North American Pulp and Paper Factbook) and achieving a wastepaper utilization rate of 40%. Undoubtedly, all of these efforts to increase the utilization of wastepaper will have a moderating effect on the pulpwood stumpage price in Louisiana.

Panel and Lumber Industry

The moderating effect of increased utilization of the waste paper on pulpwood price could be canceled by the rapid expansion of the oriented strandboard (OSB) panel product industry. In just 15 years, the OSB has become a competitive substitute for softwood plywood in construction (Spelter 1988). It now satisfies about one third of the structural wood panel market. Because OSB is a composite made with small wooden strands, the OSB industry competes with the pulp and paper industry for the same pulpwood as raw material. In 1996 and 1997, twenty mills with more than 7 billion square feet of new OSB capacity or roughly half of the current production capacity will be coming on stream. All ten of the new OSB mills will be in the South (Random Lengths 1995). One of the new mills, the 300 million board feet OSB mill of Willamette Industries located in Arcadia, Louisiana is scheduled for production start-up in 1996. Thus the cheap

southern pine pulpwood that would have materialized may never be realized as a result of the rapid expansion of the OSB industry.

In an interesting development the OSB industry is also looking into the possibility of recycled material as a source of fiber supply. A particleboard plant in Eugene, Oregon obtains up to half of its furnish from construction waste, pallet crating, and other sources (Skog et. al. 1995). The OSB industry in particular and the composite panel industry in general are always looking for the cheapest combination of virgin and recycled material to produce the best product at the lowest possible cost.

In contrast to the pulp and paper industry, the sawmilling industry during the last 20 years has responded to log supply challenges by adapting many technical breakthroughs that enhance the lumber recovery from a log supply that is declining in both average piece size and quality. Prominently among them are the thinner kerf saw blades, the computerized set-works and optical log external profile scanner that have increased the lumber recovery from logs of all sizes. The most recent development involved the application of curve sawing technology to southern pine sawmills. At this time, only a few of southern pine sawmills in Louisiana and the South have adopted this technology. Based on a 1992 report (Wang et. al. 1992), the authors found that curve sawing improves the lumber recovery by 16, 8, and 4 percent at the sawmill for logs with an average top diameters of 4.4, 5.5, and 7.1 inches, respectively. As the cost of sawlogs continues to increase while the price of southern pine lumber stagnates, sawmills will adopt new technology to increase the lumber recovery.

RECREATIONAL DEMANDS

The public's preferences for America's forests for recreation opportunities are continually changing. More than three out of every four Americans enjoyed some type of recreational activity related to wildlife or fish in 1985, many of which participated in more than one form of wildlife associated recreational activity. National trends also show that extended long-distance vacations are being replaced by more recreation opportunities in urban areas that are located near forests. Interest in non-recreational values of wilderness, such as scenic, scientific, educational, conservation, and historical uses, are growing as their significance becomes better understood and measured.

From a national perspective, the demand for outdoor recreation has continued to grow, but at a slower pace than in the 1960s and 1970s. The demand for backpacking, visiting historical places, running and jogging, day hiking, and pool swimming will grow faster than demand for other outdoor activities. Sightseeing, walking for pleasure, pleasure observation, visiting historic sites, pool swimming, and developed camping will be the most popular recreational activities by 2040. Recreational activities related to wildlife and fishing will also increase.

Recreation opportunities on forestland in Louisiana are supplied by a wide variety of public agencies and private organizations. The major suppliers of recreation in Louisiana are parish and local governments, Louisiana Office of State Parks, Louisiana Department of Wildlife and

Fisheries, Louisiana Office of Forestry, U.S. Forest Service, U.S. Army Corps of Engineers, the National Park Service, and the U.S. Fish and Wildlife Service.

In 1985, the U.S. Soil Conservation Service (SCS) conducted a survey of all developed recreation facilities within the jurisdiction of each of its parish offices. This inventory is the most current inventory of recreation facilities and sites in Louisiana. Based upon the 1985 SCS recreation inventory, developed recreational facilities within a 32 parish area, excluding Forest Service areas, included 5,515 camping units, 393 boat launches, 64 swimming sites, 19 group picnic shelters, 4,113 family picnic tables, 59.7 miles of hiking trails, 6 miles of horse trails, 10.2 miles of ATV trails, 29.75 miles of bike trails, and 1 overlook.

In 1987, the Strategic Economic Conference for Forest in Louisiana's Future formed task force committees to develop action plans to address issues identified during the conference. The progress made on the major issues are as follows:

Issue: Forest Protection

- In 1993, the legislature passed an act relative to prescribed burning for land management purposes. As a result, a prescribed burner certification program was implemented. This program documents that trained and experienced burners have completed a course taught by the Office of Forestry covering prescribed burn planning, proper smoke management techniques and the environmental regulations concerning prescribed burning in the state. This program will be continued and expanded through courses at the state forestry colleges to train and certify non-experienced prescribed burners.
- A Woods Arson Prevention Committee was formed in southwest Louisiana where there has been the highest fire occurrence during the recent past. This committee is comprised primarily of concerned local citizens, business people, and forest landowners. State forestry officials and forest industry representatives provide support through statistical and technical expertise for this committee to develop localized wildfire prevention plans and projects. Plans to expand this concept to other high wildfire occurrence areas in the state may be explored.

Issue: Land Use and Forest Management

- In 1995, the Louisiana legislature passed Act No. 302, the Right to Farm and Practice Forestry bill. This bill requires governmental agencies to complete impact assessment of their regulations on farm and forestland and give landowner remedy to seek compensation if regulations cause a diminution in the fair market value of the property of 20 percent or more.
- In 1992, the Louisiana legislature passed Act. No. 223 to permit a timber sale from undivided property if owners representing at least 80 percent of the ownership interest agree to the timber sale and if the buyer has either contacted or has made what the law describes as a "reasonable" effort to obtain consent from the other owners.
- Louisiana's Forest Stewardship Program encourages the wise use and management of resources that maintain and enhance the value of the forests for present and future

generations. It recognizes and rewards landowners who manage their forestlands according to multiple-use concepts. Landowners in the program have access to resource management professionals to assist them in obtaining written forest management plans.

Since the start of the program in 1990, there have been 753 applicants, with 612 forest management plans written, totaling 64,767 acres. There are 62 certified Stewardship Forests, totaling 8,882 acres.

Issue: Environmental Impact

- In past years, common forestry practices have come under scrutiny, especially with regard to water quality (nonpoint source water pollution). However, results from water quality assessments in the 1990, 1992, and 1994 305(b) reports show the quality of surface waters adjacent to silvicultural activities to have improved over time. In 1990, of the 8,665 river miles assessed in the state, 1,339 miles, or 15.5 percent, were found to have some type of impact from silvicultural activities. In 1992, silvicultural impairment of these waters was reported to be 1,167 miles; a 13 percent reduction in impairment from the previous assessment. In 1994, impairment attributed to silvicultural activities was stated to be 758 miles. This is a 35 percent reduction from 1992 and total overall reduction in silvicultural impairment of 43 percent from the 1990 figures. The same decreasing trend over time holds true for lakes, reservoirs, estuaries, and bays. This reduction in silvicultural impairment to the state's water occurred during periods of modern-day record level timber harvesting activities. Also, excessive amounts of rainfall had occurred during the years of 1990 through 1994.

This improvement in surface water quality over time can be attributed to several things. First, and foremost, is the successful implementation of the state's non-regulatory forestry best management practices to silvicultural activities. The increase in implementation of best management practices closely parallels the improvement in water quality in those surface waters adjacent to silvicultural activities. The success of the education and outreach programs conducted by State and Federal agencies working together with forest industry has also contributed greatly to the decrease in water quality impairment due to forestry activities. The Louisiana Department of Environmental Quality, together with the Louisiana Department of Agriculture and Forestry, the Louisiana Cooperative Extension Service, the U. S. Forest Service, the Natural Resources Conservation Service, and the Louisiana Forestry Association have taken the lead in these efforts to date. These efforts include publication of a BMP Manual, and statewide BMP training sessions to over 4,000 persons. A section on BMPs is also included in the Cooperative Extension Service Forest Landowners short course. Over the past nine years, there has been an increase in best management practice implementation on silvicultural sites. This compliance rate has increased from less than 10% BMP implementation in 1985 to a 51% implementation rate in 1991 and 80% implementation rate in 1994.

In the Louisiana forest community, BMP compliance surveys and audits are not periodic occurrences, but rather are conducted as a routine forest management practice. BMPs are considered a major expenditure item for the forest management and procurement aspects of the forest industry. An informal survey was conducted by the Louisiana Forestry Association on behalf of the Louisiana Forestry CZARA sub-committee of eight companies involved in forestry related work on nearly 2.5 million acres of forest land statewide. All eight companies monitored BMP compliance in logging or silviculture activities on their clients and company land. In addition, BMP training sessions were conducted by these companies either for their employees or for independent logging or silvicultural contractors.

- In 1991, the Louisiana Department of Agriculture and Forestry began a comprehensive pesticide monitoring program of the state's surface water which receives runoff from various types of agricultural production and silvicultural operation throughout the state. Forty-five water sampling station locations were established downstream from junctures in watersheds receiving runoff from agricultural cropping areas, as well as silvicultural operations.

None of the most commonly used forestry pesticides have been detected.

Issue: Forest Productivity

- Since 1986, a total of 118,961 acres of trees have been established on marginal cropland, with 56,893 acres of this total being established in former bottomland hardwood areas.
- The Louisiana Department of Agriculture and Forestry insures an adequate supply of quality forest tree seed and seedlings available to private non-industrial forest landowners. Seed orchards are maintained to produce an adequate supply of genetically superior pine seed to meet the demand for seed and to supply the state nurseries for seedling production, and progeny testing continues to insure quality of seed. The State nurseries produce between 25-40 million quality forest seedlings annually; an adequate supply to meet private, non-industrial forest landowners demand. Also, two private nurseries produce an additional 17 million seedlings annually.
- A survey in 1993 estimated beavers had impacted almost one million acres of forestland within the state, with over \$14.6 million in damages to the forest resource.

The Louisiana Department of Agriculture and Forestry currently has an ongoing trapping program.

Issue: Marketing and Manufacturing

- In 1993, the Forest Products Laboratory at Louisiana State University was created to promote the development of secondary wood manufacturing facilities in Louisiana.

Issue: Education

- In 1992, the Louisiana Forestry Association sponsored “Talking Outdoors,” a radio show hosted by Glynn Harris. Public Service Announcements were aired on various forestry topics. The Louisiana Cooperative Extension completed a video “A Tree I See - Story of Louisiana’s Forest Products History.”
- Since 1987, Louisiana Project Learning Tree (PLT) and Environmental Awareness Program have provided training and professional development workshops for approximately 12,000 educators. In conjunction with PLT, a forestry resource kit, *Tree Trunks*, has been provided to school systems and individual schools, approximately 50 statewide.
- Forestry Awareness Day was designed for upper elementary and high school students. Students are exposed to various forestry/natural resource topics over a day-long outdoors experience. Ten parishes host Forest Awareness Day providing natural resource education to approximately 6,000 students annually.
- The Louisiana Forestry Association (LFA) has increased its effort to monitor legislation affecting forestry and briefings with legislation about forestry issues through its legislative committee. A newsletter concerning the status of legislation is mailed to LFA members during the legislative session.
- The LFA has sponsored workshops on forest management investment, taxes, long-term investment strategies for non-industrial landowner through LFA’s regional meetings.
- The Louisiana Cooperative Extension Service has revised the number and quality of continuing education programs for foresters on general communication skills.

Recommendations for Future Actions

- Establish a state cost-share program for tree planting to help defray regeneration costs so as to encourage long-term investment in the management of the forest resources.
- Establish state tax incentives for tree planting.
- Increase education of private, non-industrial forest landowners on future opportunities for tree planting and forest resource management.
- Disseminate information on low cost, less intensive forest management techniques.
- Encourage landowners to reforest as quickly as possible following final harvest.
- Educate loggers on forest management practices.
- Conduct forest inventory surveys on 5-year cycles in order to remain knowledgeable on changes in the forest resource and provide a foundation for long-term planning.
- Encourage and support changes in federal laws to encourage increased forest management/reforestation activities. This could include such changes as increasing the reforestation tax credit limit from \$10,000 to \$20,000 per year. Reduce the authorized amortization period from seven to five years and increase the allowable amount from \$10,000 to \$20,000. Other favorable tax law changes at the federal level could include reduction in long-term capital gains rates, and modification of the passive activity loss regulation.

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